

Title: Amusement Park Extravaganza

Brief Overview:

The students involved in this task will engage in activities pertaining to geometry and measurement. Students will construct models, design an original park and write to persuade. By completing this task students will extend and refine their geometric thinking, calculate area and perimeter, identify the attributes of geometric figures, and relate these experiences to real life.

NCTM 2000 Principles for School Mathematics:

Equity: *Excellence in mathematics education requires equity - high expectations and strong support for all students.*

Curriculum: *A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.*

Teaching: *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*

Learning: *Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.*

Assessment: *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*

Technology: *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.*

Links to NCTM 2000 Standards:

Content Standards

Number and Operations

Geometry

Analyze characteristics and properties of two-and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships; identify, compare, and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes; classify two-and three-dimensional shapes according to their properties and develop definitions of classes of shapes such as triangles and pyramids; investigate, describe, and reason about the results of subdividing, combining, and transforming shapes; explore congruence and similarity; and make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions.

Use visualizations, spatial reasoning, and geometric modeling to solve problems; build and draw geometric objects; create and describe mental images of objects, patterns, and paths;

identify and build a three-dimensional object from two-dimensional presentations of that object; identify and draw a two-dimensional representation of a three-dimensional object; use geometric models to solve problems in other areas of mathematics, such as number and measurement; and recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life.

Measurement

Understand measurable attributes of objects and the units, systems, and processes of measurement; understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute; understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems; carry out simple unit conversions, such as from centimeters to meters, within a system of measurement; understand that measurements are approximate and how differences in units affect precision; and explore what happens to measurements of a two-dimensional shape such as its perimeter and area when the shape is changed in some way. Apply appropriate techniques, tools, and formulas to determine measurements, develop strategies for estimating the perimeters, areas, and volumes of irregular shapes; select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles; and select and use benchmarks to estimate measurements.

Process Standards

Problem Solving

Instructional programs from pre-kindergarten through grade 12 should enable all students to build new mathematical knowledge through problem solving; solve problems that arise in mathematics and in other contexts; apply and adapt a variety of appropriate strategies to solve problems; and monitor and reflect on the process of mathematical problem solving.

Reasoning and Proof

Instructional programs from pre-kindergarten through grade 12 should enable all students to recognize reasoning and proof as fundamental aspects of mathematics; make and investigate mathematical conjectures; develop and evaluate mathematical arguments and proofs; and select and use various types of reasoning and methods of proof.

Communication

Instructional programs from pre-kindergarten through grade 12 should enable all students to organize and consolidate their mathematical thinking through communication; communicate their mathematical thinking coherently and clearly to peers, teachers, and others; analyze and evaluate the mathematical thinking and strategies of others; and the language of mathematics to express mathematical ideas precisely.

Connections

Instructional programs from pre-kindergarten through grade 12 should enable all students to recognize and use connections among mathematical ideas; understand how mathematical ideas interconnect and build on one another to produce a coherent whole; and recognize and apply mathematics in context outside of mathematics.

Representation

Instructional programs from pre-kindergarten through grade 12 should enable all students to create and use representations to organize, record, and communicate mathematical ideas; select, apply, and translate among mathematical representations to solve problems; and use representations to model and interpret physical, social, and mathematical phenomena.

Links to National Science Education Standards:**Grade/Level:**

Grade 3

Duration/Length:

Four class periods (60 minute sessions)

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

Calculate area and perimeter

Identify and name the attributes for geometric figures, flat and solid

Basic math vocabulary for geometry and measurement

Student Outcomes:

Students will:

Work collaboratively in groups and individually

Write to persuade

Understand and identify the attributes of geometric figures

Calculate area and perimeter

Create an advertisement for their amusement park

Demonstrate their knowledge of geometry by communicating orally and in writing

Materials/Resources/Printed Materials:

Large grid paper – 2 sheets per group
Centimeter grid paper
Crayons/color pencils
Rulers
1 Bag of marshmallows per group
1 Box of toothpicks per group
Student Resource Sheets # 1-7
Teacher Resource Sheets # 1-3
Writing to Persuade Graphic Organizer
Roller Coasters: Or I Had So Much Fun, I Almost Puked by Nick Cook
Chart paper

Development/Procedures:

Day 1

Materials

Large grid paper – 2 sheets per group
Crayons/colored pencils
Rulers
Student Resource Sheets # 1-3
Teacher Resource Sheet # 1 (Optional 2c)

Introduction

To engage the students tell them that you are going to give them several clues about a place and they need to guess what place you are describing. Remind them to use their 5 senses to help. Examples of clues are: I hear screams; I smell popcorn, pizza, cotton candy; and I see someone dressed as Mickey Mouse. Ask students to guess the location (Amusement Park).

Have students work in groups to create a web to show what they know about amusement parks. Record ideas on chart paper.

Then have students create a list of what they would include in their ideal amusement park using **Student Resource Sheet # 1**. Next, instruct students to choose from the list. Then instruct students to circle their choices, one from each category.

Tell the students to fasten their seatbelts, hold onto their hats, and sit back and enjoy the ride as they design their own amusement park!

Activity

Read vignette on **Teacher Resource Sheet # 1**. Display it on the overhead.

Introduce “Mr. Ferris Wheel’s Training Session” worksheet- **Student Resource Sheets # 2a-2c**. Students will complete this paper in preparation for designing their own amusement park.

After practicing, have students design their own amusement park with the following criteria: 1 food booth, 1 game booth, 1 thrill ride, and 1 area of choice using **Student Resource Sheet # 3**. These should be the circled items on their brainstorming list. Have students complete a rough draft on a large piece of grid paper prior to completing a final draft of the amusement park on another piece of grid paper. If large grid paper is not available, use centimeter grid paper (**Teacher Resource Sheet # 2c**)

Assessment

Once students have completed their amusement park, have them share their plans. Teacher will assess student's final product for accuracy in calculating area and perimeter. Have students choose one of the amusement park places and explain how they calculated the area and perimeter.

Day 2

Materials

- 1 Bag of marshmallows per group
- 1 Box of toothpicks per group
- Student Resource Sheets # 4a-4b

Introduction

Review previous lesson.

Read Roller Coasters: Or I Had So Much Fun, I Almost Puked by Nick Cook

Tell the students that it is time for them to construct the thrill ride they drew on the grid paper!

Activity

Teacher will model how to use mini marshmallows and toothpicks to construct solid geometric shapes. For example, have students construct two squares and ask the students what they could do to the two figures to make it a cube. Placing the toothpicks into the center of each mini marshmallow can do this constructing. Discuss the construction of other solid figures.

Students will work in groups of 4 to construct their rides.

Have students work in their groups to select the ride they will construct.

After the students have completed the model, have them complete "Amusing Attributes" - **Student Resource Sheets # 4a-4b**.

Have student take a gallery walk to observe the different models.

Assessment

Have students complete a journal entry. Have them answer the following questions – How does your model compare to your original design on paper? Describe your model using math vocabulary. How could this activity be improved?

Students are assessed through teacher observation during the activity and **Student Resource Sheets # 4a-4b** and sharing of journal responses.

Day 3

Materials

Student Resource Sheets # 5-7

Teacher Resource Sheets # 2-3

Persuasive Writing Organizer

Introduction

Review previous days lesson

Play a game of “Amusement Park Charades”. Tell them that “Now that you have taken an ‘imaginary ride’ through an amusement park, it’s time to take your pencil, for a ‘writing ride’. You will now write to persuade Mr. Ferris Wheel and his family to build your amusement park.

Activity

Review the steps in the Writing Process when you write to persuade.

Read the prompt, “Are You Ready to Amuse Me?” **Student Resource Sheet # 5** and identify the topic, audience, purpose, and form.

With a partner have students brainstorm reasons why their amusement park should be selected. As a group, record responses on a class chart.

Model a teacher –selected, writing- to- persuade organizer using the prompt.

Have students’ complete steps in the writing process. Be sure students use the criteria on **Student Resource Sheet # 6** after they have completed their rough draft.

Students can write their final draft on **Student Resource Sheet # 7**

Compose a book of student writings and title it “Thrill Us and Chill Us...Letters to Mr. Ferris Wheel”. **Teacher Resource Sheet #3**

Assessment

Use teacher rubric to assess writing **Teacher Resource Sheet # 2**

Performance Assessment:

Teachers will evaluate their students understanding of geometry and measurement on a daily basis through observation, and independent practice. The ending assessment consists of questions relating to the objectives for the unit and will be scored using a rubric.

Extension/Follow Up:

Construct a bar graph of students favorite amusement park rides

Invite other faculty and students to take a gallery walk of completed final products

Write to express personal ideas about the grand opening of their amusement park.

Discuss the properties of physics relating to the engineering of rides in amusement parks.

Students design and label maps using coordinate grids to display the arrangements of rides at their amusement park.

Students write, “Amusement Park” menus and include the foods they would serve, and the prices they would charge

Students prepare and serve one of the food items from their menu.

Students generate a list of safety rules to be used in amusement parks.

Books about Amusement Parks

Roller Coasters: Or I had So Much I Almost Puked by, Nick Cook

Horrible Harry and the Drop of Doom by, Suzy Kline

The Amusement Park Mystery by, Gertrude Chandler- Warner

Scared Stiff by, Willo Davis Roberts

The Fantastical Engineer: A Thrill Seeker’s Guide to Careers in Theme Park Engineering by, Celeste Baine

Authors:

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Amusement Park Brainstorming

 <p>Food</p>	 <p>Rides</p>	 <p>Games</p>



Dear Third Grade Thrill Seekers,

You are about to experience the chance of a lifetime! Let me introduce myself. My name is Ferris Wheel. My wife, Mary Go Round, and I are looking for qualified, creative students to help us add excitement to the usual boring, same old amusement parks you normally visit. You will use your knowledge of geometry and measurement to help us create and build the most awesome amusement park. Your task will be to design an amusement park and calculate its area and perimeter. Next, you will construct a model of your original thrill ride. Finally, you will write a letter to persuade both my wife and our twin boys, Sherbert Herbert and Chocolate Charlie to choose **your** amusement park design to build. We are looking for the ultimate kid designed amusement park!

Sincerely,
Ferris Wheel



Name _____ Date _____

Mr. Ferris Wheel's Training Session

Each area takes up the following space:

Ticket booth	9 squares
Cotton candy stand	14 squares
Haunted house	21 squares
Roller coaster	24 squares

Now,

1. Plan the outline of each area and create each space on the grid.
2. Make sure each space is a rectangle or a square.
3. Label each building.

Complete the chart. Be sure to label your answers on the chart.

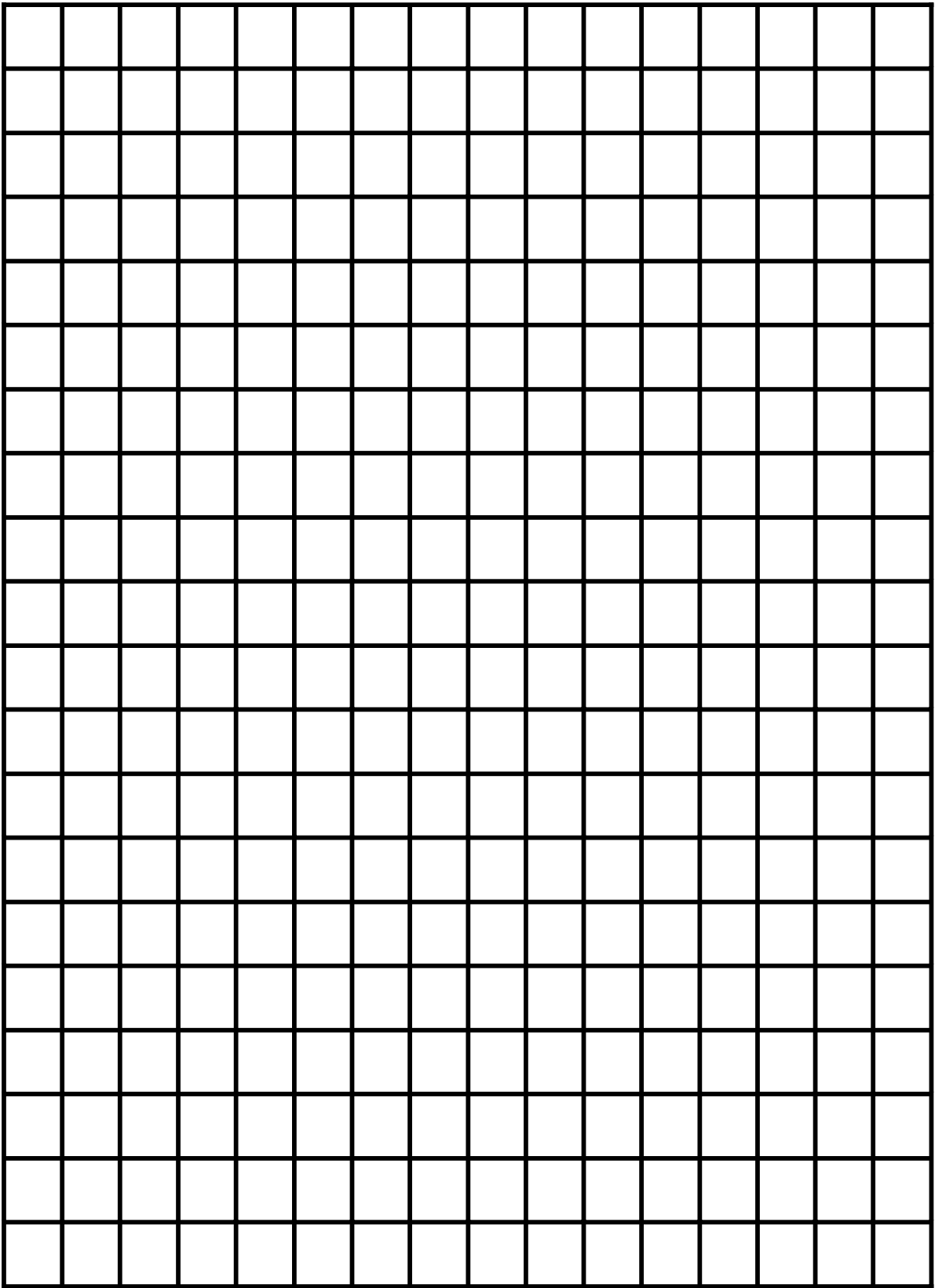
Place	Area	Perimeter

Draw a new space on your grid for the haunted house. Be sure it has the same area (21 squares) but is not in the shape of a rectangle or square.

1. How does the change in shape affect the area of the haunted house? Include supporting evidence in your answer.

2. Does changing the shape affect the perimeter? Include supporting evidence in your answer.





Name _____

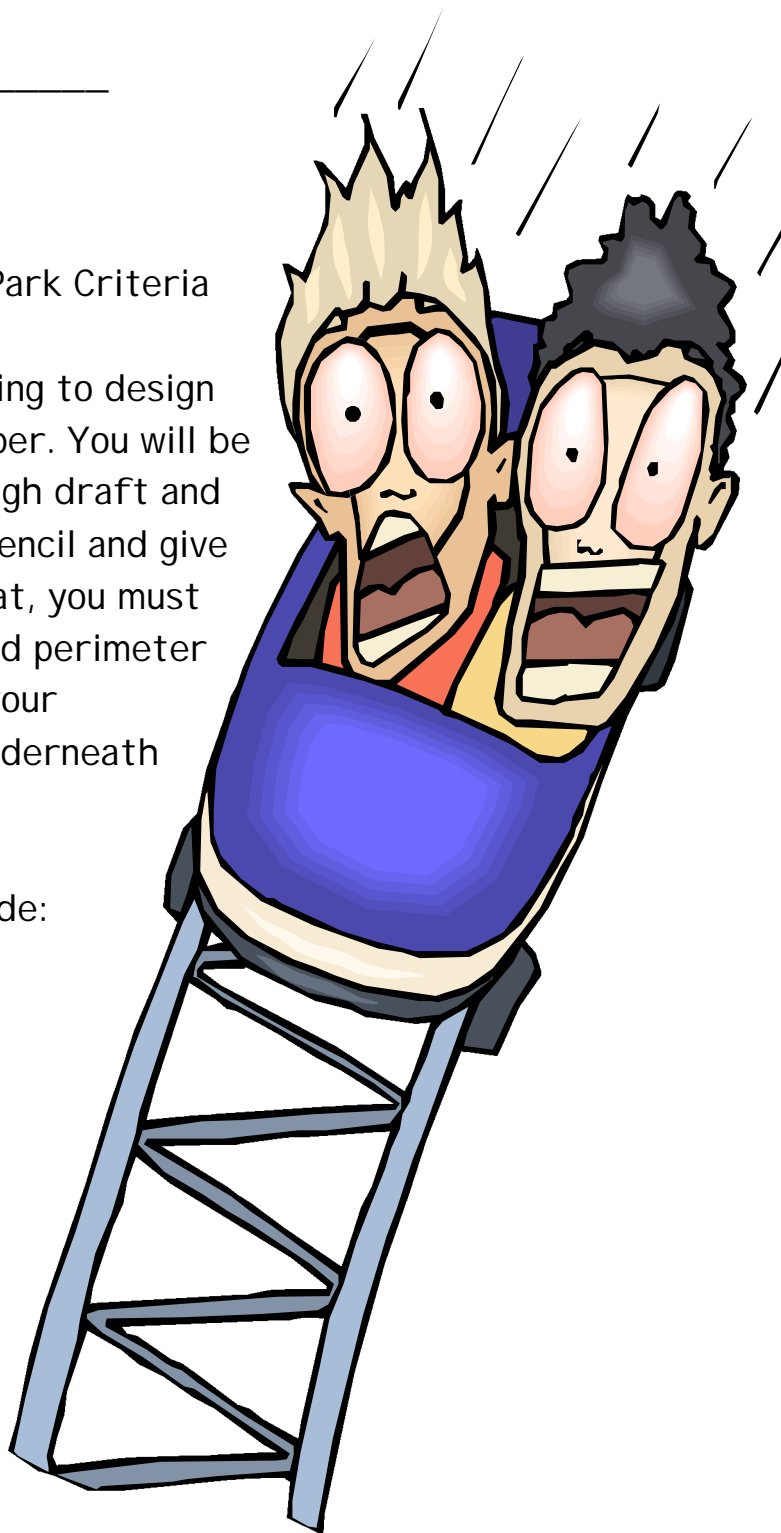
Date _____

Amusement Park Criteria

With a partner, you are going to design your amusement park on grid paper. You will be given 2 pieces – one for your rough draft and one for your final draft. Use a pencil and give each place a fun name. After that, you must calculate and record the area and perimeter of each place. Be sure to write your calculations on the grid paper underneath each place.

Your amusement park must include:

- 1 food booth
- 1 thrill ride
- 1 game booth
- 1 area of your choice



Name _____

Date _____

Amusing Attributes

Now that you have constructed your model identify the solid figures and their attributes

cube	pyramid	rectangular prism	triangular prism
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Kind of Solid	Number of Vertices	Number of Faces	Number of edges

1. What do the toothpicks represent? I nclude math vocabulary in your answer.

2. Estimate the number of solid figures in your thrill ride.

3. Compare the attributes of a cube and a rectangular prism.



Name _____ Date _____

Are You Ready to Amuse
Me?

Now that you have designed your amusement park and constructed a model of your thrill ride, it is now time to get on your last ride! You will be doing this by writing a letter to persuade me to choose your park over all of the others.

Topic: _____
Audience: _____
Purpose: _____
Form: _____

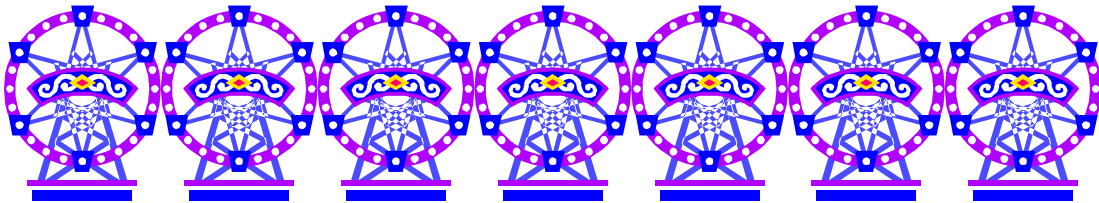
Remember when you write to persuade:

Include your opinion statement of why Mr. Wheel should choose your amusement park to build

- Include 3 reasons and examples why your amusement park should be chosen
- Include a strong conclusion, which restates your opinion.

Criteria for an Effective Letter

- I began my piece by stating my opinion clearly.
- I included enough information to fully support the position I've taken.
- My information is organized in a logical way.
- I restated my opinion in my concluding sentence.
- I used transition words.
- I checked for capitalization, punctuation and spelling.



Rubric for Writing to Persuade

3 points-

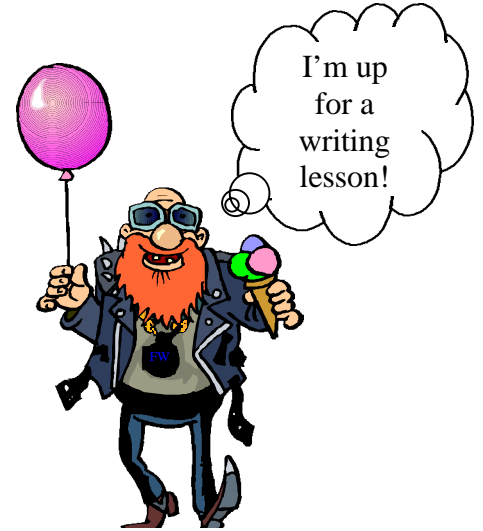
- . Clear position statement that is fully supported
- . Piece is consistently organized and logical
- . Effectively addresses audiences needs
- . Uses transition words throughout

2 points-

- . Has all components as above, but lacks fully supported reasons in their writing

1 point-

- . Seldom includes all components from above



Thrill us... Chill us...

Letters to Mr. Ferris Wheel

